electronic music
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ALIGNMENT PROCEDURE FOR EML-101 (AFTER S/N 300)

WARNING:

1. The system must be operating functionally prior to any adjustments.
2. Internal adjustments not performed by the factory are discouraged.

EQUIPMENT NEEDED:

1. Scope - capable of X-Y display
   DC - coupled vertical amplifier
   1 mV/div. sensitivity
2. Frequency counter (Heath IB-101 typical) or;
   frequency standard w/87.3 hz & 1046.5 hz or 440.0 hz or;
   Strob-o-tuner.
3. 3/32" Allen wrench (for panel screws before S/N 900)
4. Key wedge

PROCEDURE OUTLINE:

I Knob settings & panel removal

II Oscillator 2 linearity

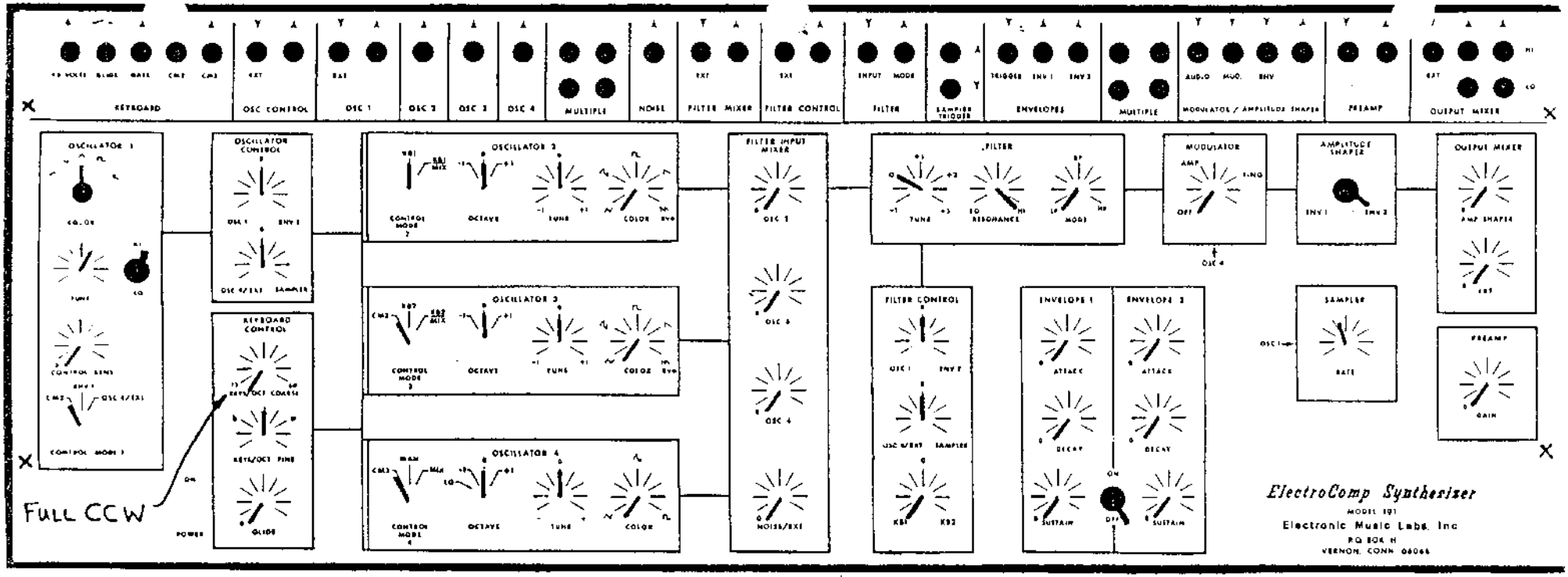
III Keyboard tuning (KB-1)

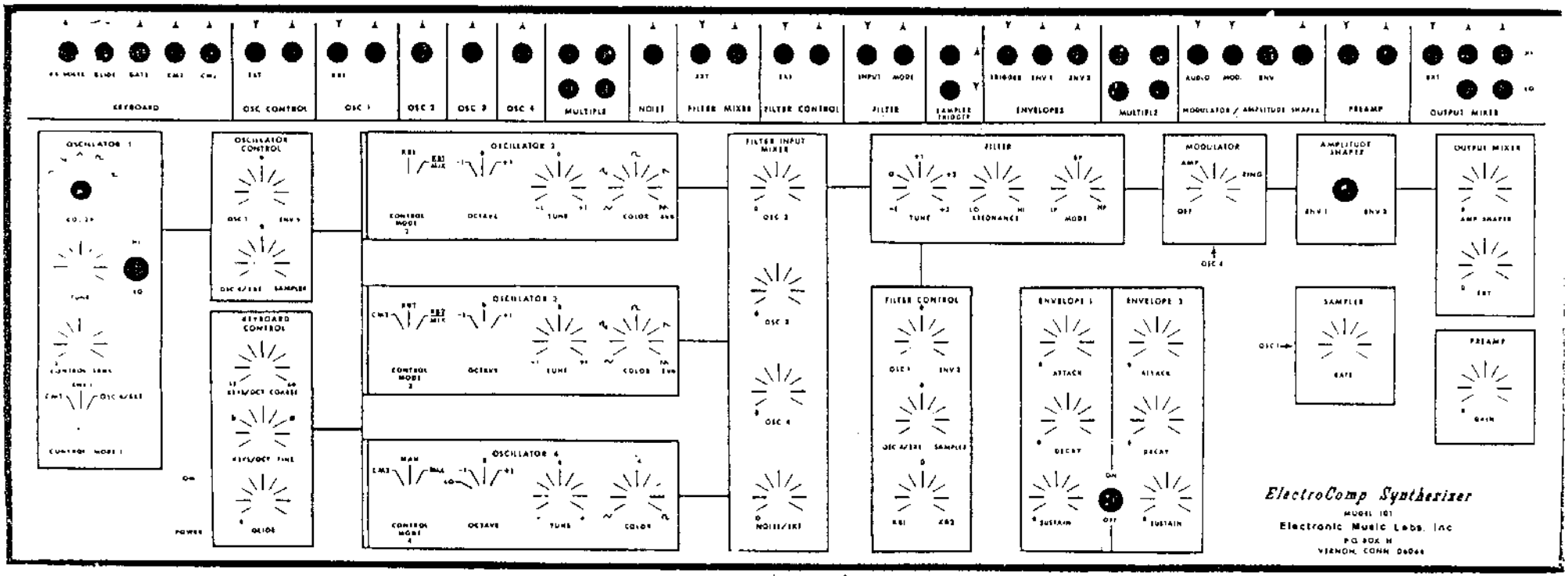
IV Oscillator tracking and KB-2 tuning

V Filter tuning

VI Filter tracking and AC null

VII VCA thump null


KEYBOARD
OSC CONTROL
OSC 1
OSC 2
OSC 3
OSC 4
MULTIPLE
NOISE
FILTER MIXER
FILTER CONTROL
FILTER
SAMPLER TRIGGER
ENVELOPES
MULTIPLE
MODULATOR / AMPLITUDE SHAPER
PREAMP
OUTPUT MIXER
OSCILLATOR 1
OSCILLATOR CONTROL
OSCILLATOR 2
OSCILLATOR 3
OSCILLATOR 4
FILTER INPUT MIXER
FILTER
MODULATOR
AMPLITUDE SHAPER
OUTPUT MIXER
KEYBOARD CONTROL
FILTER CONTROL
ENVELOPE 1
ENVELOPE 2
SAMPLER
PREAMP
FULL CCW
ElectroComp Synthesizer
MODEL 101
Electronic Music Labs, Inc
P.O. BOX H
VERNON, CONN. 06066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Name _____ Date

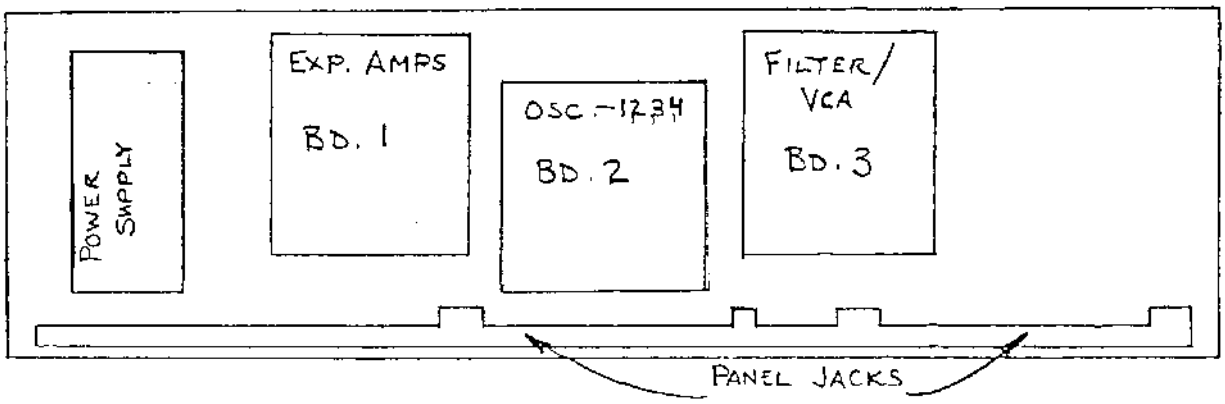
I. KNOB SETTINGS AND PANEL REMOVAL

Set knobs as shown in diagram.

Remove 5 Allen screws (marked X on panel facsimile) from front panel. Note; after S/N 900 panel screws are philipps head. Pull right side out about 2", and slide panel to right.

Be careful not to break oscillator 1 "color" switch.

Familiarize yourself with the backside of the panel.



BACKSIDE VIEW OF PANEL

POWER SUPPLY

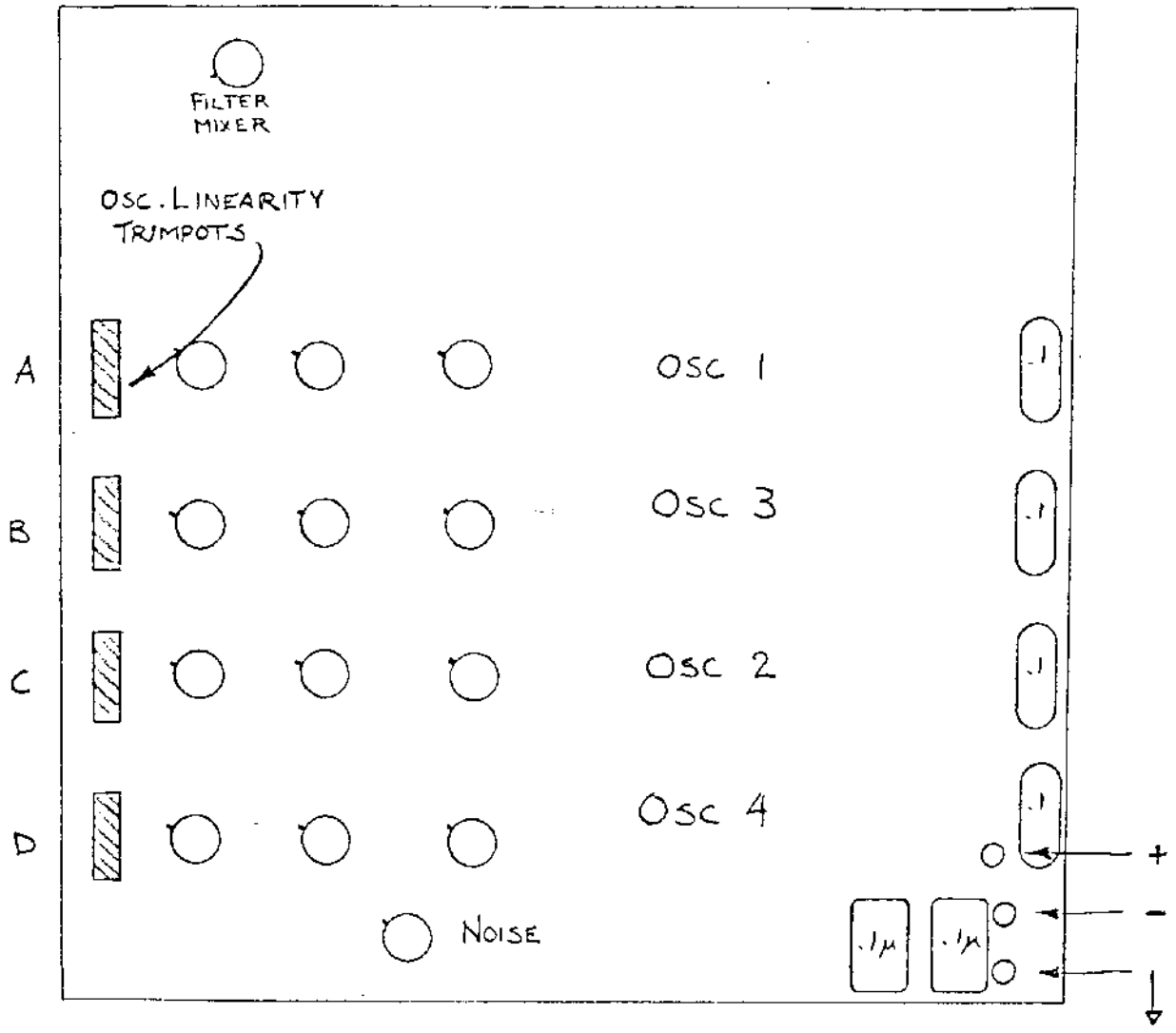
+15 V (RED)

-15 V (BLUE)

GND. (BLACK)

II OSCILLATOR 2 LINEARITY

Familiarize yourself with the oscillator board layout.



OSCILLATOR BOARD #2

If you have a frequency counter, connect it to oscillator 2 output jack. Be certain to let the counter warm-up; and when taking a reading, let the display stabilize.

If you have a standard (87.3/1046.5 hz or 440.0 hz) - connect it to the horizontal amplifier of your scope. Connect the vertical Amp to Osc. 2 output jack.

If you have a strobotuner - direct connection to Osc. 2 is possible, but you can patch Osc. 2 into an amplifier and use the tuner's Mic.

Allow the synthesizer to warm-up at least 30 minutes before making any adjustments.

Hold the low key (F note) and adjust Osc. 2 tune knob to 87.3 hz. Release low key and hold high key (C note) down. Use the "keys/oct fine" knob to produce 1046.5 hz.

CHECK OCTAVE INTERVALS: THESE SHOULD BE -

Keyboard	C Note	F Note	A Note
Highest	1046.5	698.5	880.0
	523.2	349.2	440.0
	261.6	174.6	220.0
Lowest	130.8	87.3 hz	110.0

If the upper end of the keyboard is not linear (greatest error is usually in the upper end); hold the highest F note which should be 698.5 hz. If the error is within ±4.0 hz; it may be best to leave it alone, the linearity could be acceptable. However, most units can be made linear to ±1.0 hz.

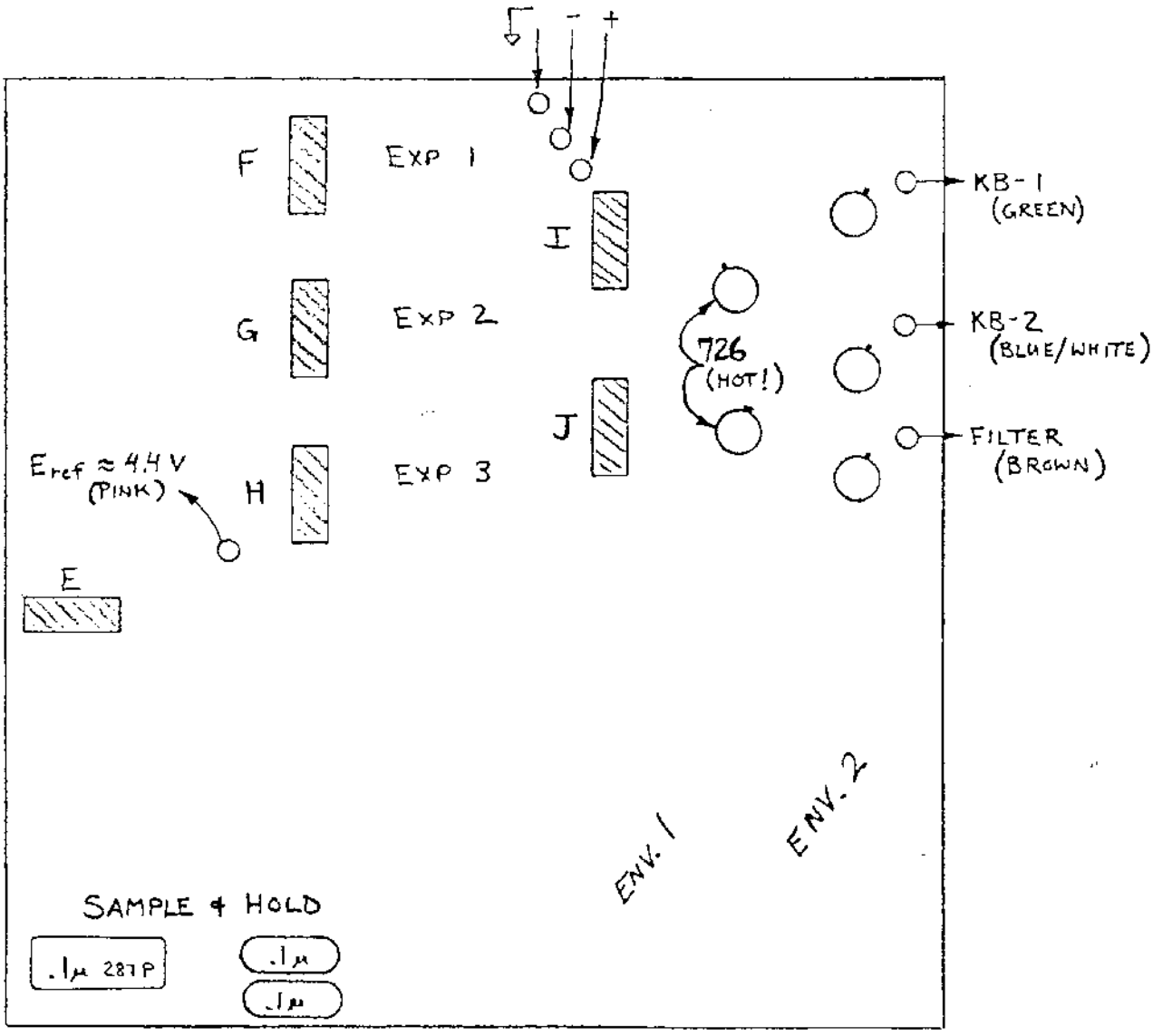
To improve linearity use the blue trimpot C on board 2. Move to increase the error of the F note.

Now - repeat above procedure; hold low F - tune oscillator 2 to 87.3 - hold high C - fine octavation to 1046.5, again check octaves. Repeat trimpot adjustment and retuning until oscillator 2 is linear.

Note - If you are using a single frequency standard such as "A" 440.0 - the linearity adjustment may not improve as the lower octave "A" has its error increased. You will have to experiment with adjustments to trimpot C to achieve best linearity.

III. KEYBOARD TUNING (KB-1)

Familiarize yourself with the Exp. Amp board layout.



EXP. AMP/ENV. GENERATOR - BOARD 1

Check all oscillator tune knobs to be sure they are rotation centered on pot shafts. If not, position and tighten.

Set oscillator 2 tune and key/oct fine to "zero". Hold low F key and adjust blue trimpot F for 87.3. Then hold high C and adjust blue trimpot E for 1046.5.

Oscillator 2 should now be tuned and linear. You will no longer need the counter or standard.

IV. (A) OSCILLATOR TRACKING

With vertical amp of scope on oscillator 2 connect horizontal amp. to oscillator 3 (verify CM-3 switch is in CM-2 position). Hold high C and tune oscillator 3 to standstill display.

Hold low F and adjust trimpot B to stop any roll. Retune high C and recheck low F. Oscillator 3 should now track with oscillator 2.

Repeat above steps for oscillator 4 (using trimpot D) and oscillator 1 (using trimpot A).

IV (B) KB-2 TUNING

With scope display Osc. 2 vs. Osc. 3, tuned to high C standstill; switch Osc. 3 to follow KB-2. Hold high C, adjust trimpot I for a standstill pattern.

Hold low F, adjust trimpot G for a standstill. Readjust I for high C - repeat low F and high C adjustments until keyboard is standstill for any note. KB-2 now tracks KB-1 and there should be little or no change when Osc. 3 is switched from CM-2 to KB-2.

NOTE - Overshooting the adjustment of trimpot G (for low F) will speed up the tuning.

V. FILTER TUNING

Disconnect the brown wire from filter Exp. Amp on board 1 and pull the blue/white wire from KB-2. Push the blue/white wire onto the filter pin.

With oscillator 2 on KB-1 switch to -1 octave and oscillator 3 on KB-2 switch to +1 octave.

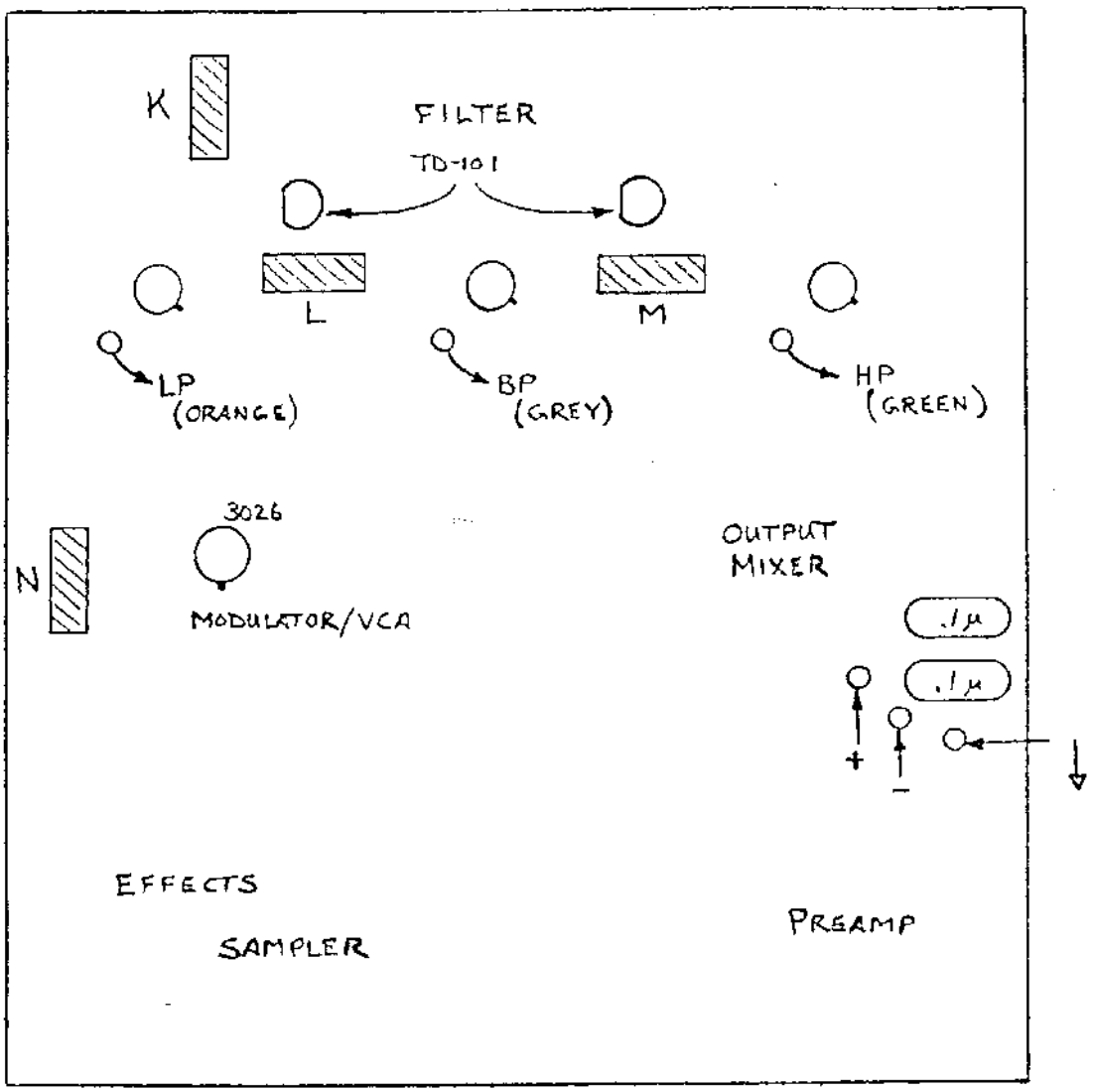
Using the same procedure for tuning KB-2; use trimpot J for high C standstill and trimpot H for low F standstill.

Filter drive should now follow the keyboard.

Reconnect the blue/white wire to KB-2 pin, and the brown wire to filter pin.

VI. FILTER TRACKING AND AC NULL

Familiarize yourself with filter board layout.



FILTER/VCA - BOARD 3

Set scope to .5 V/div. vertical sensitivity and about 2 msec/div. horizontal display. Connect vertical input to filter output.

Turn Osc. 2 filter input mixer level knob about ½ way. Strike high C and use filter tune knob to peak signal (should be near "0" if Osc. 2 is on zero octave). Adjust level for 4 div. peak-to-peak display.

Strike low F, adjust trimpot K for peak. Strike high C, repeak filter tune. Slide up and down keyboard - signal should not dip or shift DC level more than 50%. If so, check first for 748 op amp scream (look at HP, BP, and LP pins with scope @ 20 mV/div, and no signal into filter). Then check TD-101 devices for failure.

Switch Osc. 2 through -1, 0, +1 octaves and check for reasonable tune peaks and tracking levels of filter.

Turn Osc. 2 input level off (no signal), with filter tune on "0" peak turn reasonance to Lo (full counterclockwise). Switch Osc. 1 to square (⊓⊔) and filter control to full Osc. 1.

With scope on .1 V/div. look at LP pin (orange wire), adjust trimpot L for minimum signal. Now look at HP pin (green wire), adjust trimpot M for minimum signal.

Repeat until upper end of keyboard is best nulled. Some increase in level toward lower octaves is normal.

Filter should be tuned, tracking and nulled.

VII. VCA THUMP NULL

Turn Osc. 1 off of filter control (still no signal). Set all envelope controls to minimum (full ccw) for spike.

With scope still on .1 V/div. look at modulator/amp shaper output. Rapidly pulse a key with a finger, adjust trimpot N for minimum spike. You should be able to have a straight line at .1 V/div.

All adjustments are complete on EML-101.